Name: Date:

Polynomial Factoring solution (version 45)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 + 2x + 19 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(19)}}{2(1)}$$

$$x = \frac{-(2) \pm \sqrt{4 - 76}}{2(1)}$$

$$x = \frac{-2 \pm \sqrt{-72}}{2}$$

$$x = \frac{-2 \pm \sqrt{-36 \cdot 2}}{2}$$

$$x = \frac{-2 \pm 6\sqrt{2}\, i}{2}$$

$$x = -1 \pm 3\sqrt{2}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $-7 + 2i$ and $-9 + 3i$ in standard form $(a + bi)$.**

Solution

$$(-7 + 2i) \cdot (-9 + 3i)$$

$$63 - 21i - 18i + 6i^2$$

$$63 - 21i - 18i - 6$$

$$63 - 6 - 21i - 18i$$

$$57 - 39i$$

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3. **Write function $f(x) = x^3 + 6x^2 - x - 30$ in factored form. I'll give you a hint: one factor is $(x + 5)$.**

Solution

	1	6	-1	-30
-5		-5	-5	30
	1	1	-6	0

$$f(x) = (x+5)(x^2+x-6)$$

$$f(x) = (x+5)(x+3)(x-2)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x+7)\cdot(x+2)^2\cdot(x-2)\cdot(x-6)^2$$

Sketch a graph of polynomial $y = p(x)$.